Sandia National Laboratories
Primary Hazard Screening (PHS)

PHS Number: SNL06A00989-004

CINT Integration lab # 1504 - SEM/FIB

I. Signatures (Electronic signature dates shown)

Risk Management Determination

Hazard Classification: **SIH**

Required Documentation: **PHS**

Facility/Project Designator: **Radiological Facility**

Date Created: **01/18/2010**

DOE Order References: **425.1C**

Results as of: **03/18/2010**

Activity-level PHS: **N**

Author / Technical Review:

I am knowledgeable of the activities and hazards covered by this PHS and, after doing due diligence, the description, notes, identified hazards, analyses, and other information contained in this PHS are complete and accurate.

Author : **Nogan,John** Org: **01132** **02/04/2010 22:14:15**

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have performed the above reviews and concur that those items are complete and accurate.

ES&H Coordinator : **Starr,Michael** Org: **01131** CONCUR - **02/23/2010**

Quality Review:

This PHS meets minimum Corporate standards for 1) description/notes and 2) required information. There are no gross inconsistencies. I have performed the above reviews and concur that those items are complete and accurate.

PHS Team : **Costanzo,Jessica Amoret** Org: **04126** CONCUR - **02/24/2010**

Approver:

The description and notes describe and scope the activities performed under this PHS. All hazards have been identified. Questions are answered correctly and, as necessary, rationale or clarification is provided. All hazards in the HA have been analyzed, including the identification of controls for each hazard. I have reviewed this PHS and concur that its contents are accurate and complete. I will ensure that the requirements and commitments in this PHS are implemented prior to the start of work.

Approving Manager : **Hearne,Sean J.** Org: **01132** APPROVE - **03/18/2010**

II. PHS Purpose, Limitations, and Use in Work Planning and Control

Purpose of the PHS

For the scope of work identified, the PHS identifies:

- High-level (primary) hazards (e.g. chemicals, toxic gasses, explosives)
- Some, but not all controls (e.g. PPE, respirators, ventilation, lockout/tagout, and NEPA), please see the limitations section, below for additional information.
- A Hazard Classification, which determines the requirements for additional Safety Basis documents [e.g., Hazard Analysis (HA), Safety Assessment (SA), Safety Assessment Document (SAD), Documented Safety Analysis (DSA) etc.]
- For the hazards and controls identified, the PHS enables the identification and communication of:
  - Requirements documents (such as ES&H Manual chapters, sections, and supplements) that must be reviewed to determine specific requirements applicable to the work
  - ES&H Manual-required training
  - Action and Warning messages that highlight key requirements.

The Hazard Analysis section of the PHS is used to perform a high-level hazards analysis and controls selection for hazards with a Hazard Classification of 'Low' and, optionally, for Standard Industrial Hazards (SIH).

Limitations of the PHS for Use in Activity-level Work Planning and Control

Unless additional information is specifically added, a PHS **does not** contain all of the detail necessary to identify and control hazards at the activity/task level. The reasons for this include:

- PHSs are typically written at the project or work-area level and therefore, do not contain sufficient detail about individual tasks or the hazards/controls associated with them.
- While the PHS provides requirements for the hazards and controls identified, it **does not** provide a comprehensive list of all requirements in the ES&H Manual and related documents. Furthermore, many of the requirements are identified by reference to sections of the ES&H Manual, which must be evaluated for requirements applicable to the specific work being performed.
- It is impractical to ask enough questions to generate the level of detail necessary for activity/task-level hazard identification and control; human analysis must be employed. Consequently, details must be developed by a work planner, including:
  - Specific details about the hazard (e.g. what chemical, which laser, when, under what conditions, and where)
  - Other controls needed, since the only controls automatically identified are the ones with ES&H Manual requirements that result from their use. Important controls, such as access control, interlocks, shielding, monitoring, and personnel qualifications are not identified.
  - Specificity about controls (e.g. type of PPE, ventilation specifications)
  - Details on how and when you implement each control
  - Information on who needs to take what training

Recommended Use of the PHS to Support Activity-Level Work Planning & Control

The information developed in the PHS and any resultant Safety Basis documents should be utilized when performing the subsequent task of activity-level hazard identification, analysis, and control selection, where (1) the major work steps are identified; (2) the hazards associated with each major step are identified and analyzed; and (3) the controls for each hazard are identified and verified to be adequate to protect the involved workers. For the vast majority of work performed at Sandia, the Job Safety Analysis form (SF 2001-JSA) or equivalent is the recommended tool to use for this purpose. The JSA provides a systematic process for a team of involved workers and SMEs to ensure the activity-level work scope is rigorously analyzed to identify all potential hazards and specify appropriate controls for each hazard. Information from the PHS and Safety Basis documents is used as an input in developing the JSA, and the results of the JSA are used to develop TWDs, procedures, or other work instructions as appropriate.

In some cases, the PHS system may be used for activity level hazard identification, analysis, and controls identification, however, the PHS usually must be supplemented with additional information to provide the level of detail necessary to serve this purpose. In these cases, a PHS should be designated as an "Activity-Level PHS" on the PHS General Information page; however, these PHSs will be reviewed during the review and approval process to confirm that they contain the detail necessary to identify the hazards and controls at any stage of the work being performed. If determined to not be adequate, options include (1) revising the PHS to include adequate information; or (2) removing the "Activity-Level PHS" designation, and using a JSA/JSA-equivalent process to perform activity-level hazard identification, analysis, and control selection.

III. Table of Contents

IV. General Information

Document Status

Question Set Version: **I**

Status: **APPROVED** Expiration Date: **03/18/2011**

Responsible Organization: **01132**

Radiological Protection Level for this facility or project: **Normal**

Description

This PHS covers the Focused Ion Beam area (Room 1504 and adjoining Equipment Chase) of the CINT Integration Laboratory and specifically includes normal operations and maintenance for the focused ion beam tool / secondary electron microscope tool. The primary function of the tool is to micro-machine Si micro-fabricated parts into unique geometries using a 10 nanometer wide stream of ionized gallium in a vacuum chamber. The chamber is exhausted to the centralized house exhaust system. In addition, this room contains a Heidelberg Instruments Inc. DWL 66-fs Lithography Mask laser writer, which contains a class 3B HeCd laser, 120 mW @ 442 nm, that is interlocked to be inherently safe during normal operation.

Notes from Document or Interview

General Document Notes

Locations

Primary Location

Site : **SSTP** Area : **No Tech Area** Bldg : **518** Room : **N/A**
Detail : **Lab 1504**

Other Locations

None Entered

Responsible Organization History		
Organization Number	**Effective (Starting) Date**	**This Org. Submitted Document for Review**
01132	11/22/2006	Y

V. Identified Hazards

Hazard Name	Hazard Description	Source (Question or Table)
traffic related hazards	traffic related hazards for injury	Required by general corporate business process
common electrical hazards	common electrical hazards	Required by general corporate business process
RGD below LOW hazard classification requirements.	potential for minor injury or illness	QUESTION 1
Use or storage of chemicals	Potential personnel exposure to chemicals & fire protection regulatory requirements	QUESTION 5
Noncompliant storage, dispensing, or use of flammable/combustible liquids could cause fire/explosion.	fire/explosion hazard	QUESTION 5h
Circuit Breakers or disconnect switches at 50 V or more	potential electrical arc from operating circuit breakers or disconnect switches	QUESTION 6b
Standard industrial mechanical hazards	potential injury from mechanical forces	QUESTION 7
Portable power tools	potential injury from portable power tools	QUESTION 7b
Standard industrial pressure hazard(s)	Injury or damage	QUESTION 10
Environmental concern below LOW hazard classification requirements.	potential for regulatory action	QUESTION 15
Air discharge, SIH hazard	potential to emit regulated contaminants	QUESTION 15b
Regulated chemicals	potential to emit regulated contaminants	QUESTION 15b(3)
Hazardous Wastes	potential for regulatory action	QUESTION 15d

VI. Required Actions

Off-Site Requirements:

NONE
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Warning Messages:

1. Radiological safety training shall include procedures specific to an individual's job assignment. See CPR 400.1.1.32/MN471016, Radiological Protection Procedures Manual, Chapter 3, "Radiological Training Program," topic 4.3.2, for requirements and guidance. **Comment added: Personnel have completed RAD12 training.** (QUESTION 1)
2. There are a variety of requirements applicable to chemicals. Refer to the portions of MN471001 ES&H Manual relevant to the activities being performed for requirements. **Comment added: Requirements in Corporate Procedures ESH100.2.IH.1 Maintain a Workplace Free from Chemical, Physical, Biological, and Safety Workplace Hazards, ESH100.2.IH.4 Evaluate and Control Chemical Hazards have been implemented are adhered to by personnel.** (QUESTION 5)
3. All operators of the system must be qualified according to the requirements of the Pressure Safety Manual. The Pressure Operator Qualification Form (SF 2001-PQF) is available as an optional tool for documenting the applicable training and qualification requirements for pressure applications. See MN471000, Pressure Safety Manual, Chapter 2, "The Pressure Safety Program," for requirements and guidance on qualification of pressure operators. **Comment added: Personnel have completed the necessary training for operating pressure systems.** (QUESTION 10a)
4. There may also be requirements for waste minimization and documentation of waste minimization efforts/results. Contact the Pollution Prevention Team for assistance with waste minimization. **Comment added: Requirements for waste minimization and documentation of waste minimization efforts/results are implemented as necessary.** (QUESTION 15d)

Action Messages:

1. Contact your Division ES&H Team for a survey. **Comment added: A radiological survey has been completed and is documented in the Source and Device database.** (QUESTION 1a)
2. Refer to "Log of Consultation," with a subject of, "Storage, Dispensing, Bonding, and Grounding of Flammable and Combustible Liquids." Contact Fire Protection Engineering for assistance. See the ES&H Direct Access Services List. **Comment added: The requirements in the "Log of Consultation" will be implemented as needed.** (QUESTION 5h)
3. Identify PPE, shock approach, and arc flash boundary prior to operating disconnect switches. In addition, personnel must be trained on safe switching techniques/hazards. See MN471004, Electrical Safety Manual, Chapter 2, "General Safety Requirements," sections: "2.1 Electrical Work Requirements - General," "2.2 Qualifications and Training," and "2.10 Electrical Personal Protective Equipment" for requirements and guidance. (QUESTION 6b)
4. In California, Contact the Air SME if any of the chemicals being used are listed on the Toxic Air Contaminants Table. **Comment added: No action needed. Operations are in SNL/NM.** (QUESTION 15b(3))
5. As required by the ES&H Manual, Section 19A, "Hazardous Waste Management," Members of the Workforce who are owners or generators of hazardous waste **shall plan** how to control hazards and appropriately manage their hazardous waste. **Comment added: Requirements in Corporate Procedure ESH100.2.ENV.22 Manage Hazardous Waste at SNL/NM are followed by personnel.** (QUESTION 15d)

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Required Training

[Note: This training is a regulatory requirement for one or more people involved in operations associated with identified hazards. Each class may not be required by all people working in the area.] Please note that some training classes are only provided occasionally. Please be sure to allow adequate lead-time for personnel to schedule and complete training.]

Course Code	Course Title	Exclusions	Training Interval (Years)	One-time Training
CHM103	SITE-SPECIFIC CHEMICAL SAFETY TRAINING		2	No
ELC901	SAFE SWITCHING BRIEFING		--	Yes
ENV112	HAZARDOUS WASTE & ENVIRONMENTAL MANAGEMENT TRAINING	(all locations other than SNL/CA will take ENV112)	1	No
ESH100	ES&H AWARENESS		1	No
ESH200	SAFETY MANAGEMENT		--	Yes
HAZ101	EMPLOYEE BASIC HAZCOM	LAB100 is acceptable for emergency response activities, if already completed	2	No
HAZ103	SITE-SPECIFIC HAZCOM		2	No
LAB100	LABORATORY STANDARD INFORMATION AND TRAINING	LAB100 (HAZ101 is acceptable if already taken)	2	No

Course Code	Course Title	Exclusions	Training Interval (Years)	One-time Training
LAB103	SITE-SPECIFIC LABORATORY SAFETY TRAINING		2	No
PPE106	PERSONAL PROTECTIVE EQUIPMENT TRAINING		2	No
PRS150	PRESSURE SAFETY ORIENTATION	for all operators of the system	--	Yes
PRS150R	PRESSURE SAFETY ORIENTATION REFRESHER		3	No
RAD219	RADIATION-GENERATING DEVICE CUSTODIAN TRAINING	for both primary alternate custodians	1	No
RAD250	MANAGEMENT OF RADIOLOGICAL OPERATIONS		2	No

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Regulatory Requirements

Regulatory and Standards Drivers for this Facility or Lab:
[Note: ES and H Manual sections listed below contain requirements and guidance that pertain to the hazards you have identified in this PHS. It is your responsibility to ensure these requirements have been fulfilled.]

1. (QUESTION 1) CPR400.1.1/MN471001 - ES&H Manual. Section 13C, "Authorization Basis Documentation Process" for SIH, Low, Moderate, and High; unknown hazard potential since item(s) have not gone through the standards, testing rigor and hazard analysis associated with
2. (QUESTION 1) CPR400.1.1.32/MN471016 - Radiological Protection Procedures Manual, Chapter 3, "Radiological Training Program"
3. (QUESTION 1) CPR400.1.1.32/MN471016, Radiological Protection Procedures Manual, Chapter 10, "Radiation Generating Devices"
4. (QUESTION 5) MN471001, ES&H Manual, Section 6D, "Hazard Communication Standard," and Section 6E, "Laboratory Standard - Chemical Hygiene Plan"
5. (QUESTION 5) MN471001 - ES&H Manual, Section 6E, Laboratory Standard - Chemical Hygiene Plan
6. (QUESTION 5) MN471001, ES&H Manual, Section 6U, "Hazardous Material (Chemical and Biological) Inventory"
7. (QUESTION 5h) MN471001, ES&H Manual, Section 5A, "Fire Protection Requirements"
8. (QUESTION 7a) MN471001 - ES&H Manual, Section 4N, "Industrial Machine and Portable Power Tool Safety"
9. (QUESTION 7b) MN471001 - ES&H Manual, Section 4N, "Industrial Machine and Portable Power Tool Safety"
10. (QUESTION 10a) MN471000 - Pressure Safety Manual, Chapter 2, "The Pressure Safety Program"
11. (QUESTION 10d) MN471000 - Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems"
12. (QUESTION 10e) MN471000 - Pressure Safety Manual, Chapter 9, "Documenting the Operational Safety of Pressure Systems"
13. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 6, "Testing and Evaluating Pressure Systems"
14. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 7, "Verifying the Safe Operation of Pressure Systems"
15. (QUESTION 10f) MN471000 - Pressure Safety Manual, Chapter 8, "Servicing Pressure Vessels and Components"
16. (QUESTION 15b) MN471001 - ES&H Manual, Chapter 17, "Air Emissions"
17. (QUESTION 15b(3)) MN471001 - ES&H Manual, Chapter 17, "Air Emissions"
18. (QUESTION 15d) MN471001 - ES&H Manual, Section 19A, "Hazardous Waste Management" (all locations other than SNL/CA)
19. (QUESTION 15d) MN471001, ES&H Manual, Chapter 20, "Waste Management at SNL/CA" (SNL/CA only)
20. (QUESTION C1) Corporate Procedure: ESH100.2.IH.15, "Control Hazards Using Local Exhaust Ventilation and High Efficiency Particulate Air Filters"
21. (QUESTION C2) MN471001, ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)," "General Requirements for Personal Protective Equipment (PPE)"
22. (QUESTION C2a(1)) MN471001, ES&H Manual, Section 4L, "Personal Protective Equipment (PPE)," "General Requirements for Personal Protective Equipment (PPE)"
23. (QUESTION C4) MN471001 - ES&H Manual, Section 10B, "National Environmental Policy Acy (NEPA), Cultural Resources, and Historic Properties"
24. (Required by general corporate business process) MN471001 - ES&H Manual, Section 4B, "Electrical Safety Practices"
25. (Required by general corporate business process) MN471001 - ES&H Manual, Section 4K, "Traffic Safety"
26. (Required by general corporate business process) MN471001, ES&H Manual, Section 21, "Technical Work Documents (TWDs)"

VII. Related Documents

NEPA Documents	Number	Project End Date
CINT Integration Laboratories (1501, 1504, 1523, 1525, and 1527)	SNA07-0202	

Other Documents	Number	Type	Published Date
Class 3b and Class 4 Laser Systems Operations in Research	SP471409 Issue F	SOP	
Standard Operating Procedure for Working with Hazardous and Particularly Hazardous Chemicals in Center 1100 Laboratories	SOP1100.001 Issue D	SOP	07/23/2008

Permits	Number	Type	End Date
CINT's Authority-to-Construct Permit No. 1725 Actual Date of Initial Start-up	No. 1725	Air	10/11/2004
City of Albuquerque - Wastewater Discharge Permit for CINT	2238A	Water	01/04/2007

VIII. Primary Hazard Screening Worksheets

Version of Questions:**I**

Operation Type:**Facility or Lab**

Interview Worksheet:

	Questions	Answers
1	**Radiation-Generating Devices (RGDs):** Is there a radiation-generating device (RGD)? (Answer this question "no" if the RGDs are registered in storage.)	Yes

RGDs

Source Name	RGD #	RGD Class	RGD Type	Accl. Voltage	Com'l Available	Modified	Custodian	SNL/NM Owned
Dual Beam FIB/SIM	216	Exempt Shielded	Inherently Safe	30	Yes	No	HEARNE, SEAN J.	Yes
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Room = 1504; Area in Room = NE corner Comments: Alternate Custodian = AKHADOV, ELSHAN; RGD Status = Active							

	Questions	Answers
1a	Unless exempt, is the RGD *registered* with the Device Control Program?	Yes
1b	Are there any of the following radiation- generating devices (RGDs) / operations? Place a check mark to the right of all that apply.	
1b(1)	Certified cabinet	No
1b(2)	X-ray Diffraction or fluorescence analysis equipment	No
1b(3)	Other exempt-shielded RGD	No
1b(4)	X-ray generator or particle accelerator (Do your activities include an Accelerator as defined in the Help Text; **Please read the help text, since this question has significantly changed.)**	No
1b(5)	Other shielded RGD	No
1b(6)	Portable or mobile radiography RGD not using a radioactive source	No
1b(7)	Fixed device with partial shielding	No
1b(8)	Portable analytical device with an open-beam configuration	No
1b(9)	Open Installation not in the preceding classes	No
1b(10)	Unattended Installations	No
1b(11)	Neutron Generator Operations	No
1c	Will anyone enter any of the following areas?	
1c(1)	**Controlled Area (unescorted access to do radiological work)**	No
1c(2)	Radiation Area	No
1c(3)	High Radiation Area	No
1c(4)	Very High Radiation Area	No
1d	Are routine exposures *above* 100 *mrem* per year likely?	No

	Questions	Answers
1e	Could a member of the public be ***exposed*** by the operation? (This usually involves portable or mobile radiography operations).	No
1f	Will there be radiological work in a *foreign country* or territory?	No
1g	Will the activity involve an RGD owned or operated by a party other than Sandia or Sandia's subcontractors?	No
1h	Is there an RGD or a facility for an RGD acquired, built, or modified on or after January 1, 1996-excluding those RGDs classified as inherently safe or a certified cabinet?	No
1i	Will radiation *monitoring* instruments be used in this activity by MOW other than qualified Radiological Control Technicians?	No
1j	Will scrap metal generated from the project or activity come from a radiological area?	No
2	**Radioactive Materials:** Is radioactive material present?	No
3	**Explosives and Ammunition:** Are any explosives or ammunition (including explosive waste) managed, handled, processed, used, or stored?	No
4	**Lasers:** Do the activities covered by this PHS involve Regulated Laser Activities?	No

Notes: The class 3B laser is enclosed and is intrinsically safe as operated. No operations, alignments or servicing involve openly accessible or exposure to the Class 3B beam.

5	**Chemicals: *(Review the Help text before answering this question.)*** Do the activities involve chemicals?	Yes

Notes: Standard solvents will be used in small quantities (tens of ml per day) for cleaning of samples.

5a	Has the Industrial Hygiene Program performed an exposure assessment of all of the current activities involving chemicals covered by this PHS?	Yes
5a(1)	Did the results of the exposure assessment determine that workers are exposed to chemicals above an occupational exposure limit (regardless of respiratory protection)?	No
5b	Do any of the activities include? - Cleanup operations at hazardous waste sites (e.g., environmental restoration [ER] sites - Hazardous waste operations at treatment, storage, and disposal (TSD) facilities - Emergency response or post-emergency response	No
5c	Will activities have, use, synthesize, or liberate unbound engineered nanoscale particles (UNP)?	No
5d	***(Review the help text before answering this question.)*** Do the activities involve storage or utilization of simple asphyxiants?	Yes

Notes: Inert gases (nitrogen, argon, carbon dioxide, oxygen and helium) are utilized for processes within the clean room. The use of excess flow valves and the large number of air exchanges within the clean room significantly lesson the likelihood of an asphyxiant hazard.

5d(1)	In an accidental gas or cryogenic liquid asphyxiant release, could more than 560 cubic feet of asphyxiating gas be released into the work space?	No
5e	Are the hazardous chemicals, hazardous substances, or hazardous waste involved in these activities considered corrosive materials?	No
5f	Do these activities involve the use of hydrofluoric acid?	No
5g	Do chemicals used in the activities meet or exceed the Operational Permit Amounts for hazardous materials listed in the International Fire Code (IFC) and National Fire Protection Association (NFPA) Guidance? **(Please see IFC 105.6.20 Table 25-1 in the Help file for SNL Fire Protection's implementation requirements.)**	No

	Questions	Answers
Notes: A Line, Facilities, and ES&H team is identifying corrective actions to address site-wide issues with maximum allowable quantities for hazardous materials. Therefore, Operational Permits are not being issued at this time. Once corrective actions are identified, Operational Permits will be addressed by the Facility Fire Protection Assessment process (AP-230).		
5h	Do the activities involve the storage, dispensing, or use of flammable or combustible liquids?	Yes
5i	Do activities involve any of the following? - Flammable chemicals in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas (at STP) in any single container or manifolded series of containers - Equipment connected to a house system for flammable gases - Reactive chemicals in quantities greater than 1 liter of liquid, 100 g of solid, or 500 cubic feet of gas in any single container or manifolded series of containers - Oxidizers, other than nitric acid, in quantities greater than 5 liters of liquid, 1 kg of solid, or 500 cubic feet of gas in any single container or process - Pyrophoric chemicals in total quantities greater than 500g - Metal powders in quantities greater than 1 kg	No
5j	Do the activities include a process that involves highly hazardous chemicals at or above twenty-five percent of the Process Safety Management standard threshold quantities, or are there flammable liquids or gases involved in a process in a quantity of greater than 2,500 pounds?	No
5k	Do activities use or store toxic gases in quantities greater than the de minimus quantities listed in the Help file?	No
5l	***(Refer to help file to determine if quantities have been exceeded.)*** Do the activities use or store hazardous chemicals in quantities equal to or greater than the **Emergency Management screening threshold** quantities?	No
6	**Electrical:** Do workers conduct any of the following tasks? - Work on or near (within the limited approach boundary - 3.5 feet) exposed and energized (greater than or equal to 50 volts) electrical circuits or contact energized electrical circuit parts with tools or test probes? - Operate circuit breakers or disconnect switches operating at or above 50 Volts and 5 mA or more? - Perform non electrical work, but might contact exposed and energized electrical circuits - *operating at 50 volts or greater* - with equipment or materials, such as ladders, cranes, paint roller extensions, or forklifts? - Use Equipment that **operates at 50 Volts or more** and is **not listed** by an OSHA approved Nationally Recognized Testing Laboratory (e.g., UL) and operating at over 50 Volts, including extension cords or power strips?	Yes
6a	Do workers work on or near **(within the limited approach boundary - 3.5 feet)** exposed and **(greater than or equal to 50 volts)** energized electrical circuits or contact energized electrical circuit parts with tools or test probes?	No
6b	Do workers operate **circuit breakers** or **disconnect switches** operating at **50 Volts or more** and **5 mA or more**?	Yes
6c	Do workers **perform non electrical work,** but **might contact exposed and energized electrical circuits** - ***operating at 50 volts or more*** - with equipment or materials, such as ladders, cranes, paint-roller extensions, or forklifts?	No
6d	Do workers **use equipment** that operates at 50 Volts or more and is **not listed** by an OSHA-approved Nationally Recognized Testing Laboratory (e.g., UL), including extension cords and power strips?	No

	Questions	Answers
7	**Mechanical:** Does the facility or activity involve any of the following hazards or activities? - machine shop equipment - portable power tools - powder-actuated tools - centrifuge operations - forklifts - motorized hand trucks - cranes/hoists, miscellaneous lifting devices, - industrial robots or industrial robotic systems - operate light or heavy earth-moving equipment - excavations - trenches - floor or wall penetrations - stored or kinetic mechanical energy that could cause an injury during normal working conditions	Yes

Mechanical Hazards

Source Name	Potential Hazard	Com'l Available	Modified
Portable power tools		Yes	No
	Location: Site: SNLNM, Area: N/A, Building: AML, Room: Location Details:		

	Questions	Answers
7a	Do workers operate machine shop equipment?	No
7b	Do workers operate portable power tools?	Yes
7c	Do workers operate powder-actuated tools (also known as explosive-actuated fastening tools)?	No
7d	Does this facility or project activity use centrifuges?	No
7e	Are forklifts used in any operations?	No
7f	Are motorized hand trucks used in any operations?	No
7g	Are overhead cranes/hoists, mobile cranes, miscellaneous lifting devices (shop or gantry crane), or rigging used in any operations?	No
7h	Are industrial robots or industrial robotic systems used in this project or activity?	No
7i	Do workers operate light or heavy earth-moving equipment?	No
7j	Do workers perform or come into close proximity to any of these activities: - Excavations - Trenches - Floor or Wall Penetrations	No
7k	Do activities involve stored or kinetic mechanical energy that could cause an injury under normal working conditions?	No
8	**Nonionizing Radiation:** At any time, do activities produce nonionizing radiation (NIR) (excluding lasers)?	No

	Questions	Answers
9	**Thermal:** Do thermal hazards or thermal stressors exist in the work area?	No
10	**Pressure:** Are workers involved in the design, installation, operation, or maintenance of a pressure system (including pressure, vacuum, cryogenic fluid applications)?	Yes

Pressure Hazards

Source Name	Description
Compressed argon gas	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:
House Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:
Liquid Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:
vacuum system	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:

	Questions	Answers
10a	Do personnel function as pressure system operators?	Yes
10b	Do personnel function as a pressure installers?	No
10c	Do personnel handle cryogenic fluids, or design, install, or operate cryogenic fluid-handling systems?	No
10d	Does an up-to-date data package or Pressure Safety Analysis Report, reflecting current personnel and system configuration, exist for all systems?	Yes
10e	Do supplier-established pressure ratings exist for all systems and system components?	Yes
10f	Are pressure system (or component) reevaluations being performed according to the requirements of the Pressure Safety Manual? (A common example would be the replacement or retesting of pressure relief valves.)	Yes
11	**Noise:** At any time, do activities produce potentially high noise levels?	No

- Noise that would require you to raise your voice to be heard by another person three feet away (greater than 85 decibels) (potential sources include: compressors, shredders, heavy machinery, saws, grinders, pumps, etc.)
- High impulse/impact noise (potential sources include: explosions, gunshots, jackhammers, pressure releases, etc.)
- Ultrasound noise (potential sources include: ultrasonic welders, ultrasonic cleaners, and turbo-pumps, fluid flow, etc.)

	Questions	Answers
12	**Miscellaneous Hazards:** Does the facility or activity involve any of the following hazards or activities? - Ergonomic or musculosketal stressors - Construction-like activities - Work around asbestos - Ladders - Elevated surfaces (other than ladders) - Commercial underwater diving - animals and hazardous Plants - Aircraft - Airborne objects (other than aircraft) - Firearms - Use of human subjects - Use of Sealed Drums	No
13	**Outside of Manufacturer's Recommendations:** Does this work involve the use of **equipment, tools, or materials** outside of their design specifications or outside of the manufacturer's recommendations? (See Help Text for examples). Please enter each item into the hazard table.	No
14	**Non-Commercial Hazards:** Does this work involve the use of noncommercial equipment or apparatus (excluding robots, robotics systems, and equipment where the only hazard is a pressure system that has a pressure safety data package)? Please **enter each** noncommercial piece of equipment into the hazard table.	No
15	**Environmental Concerns:** Are there any potential **environmental concerns** with this activity that align with the SNL Environmental Management System (EMS) aspects, such as chemical use, fuel or oil storage, waste generation (except sanitary trash), construction activities, disturbance to habitat or protected species, or discharges to the air, ground surface, ground water, or the sewer systems?	Yes

Environmental Concerns Hazards

Source Name	Type	Est. Quantity
Wipes and Swabs	Hazardous waste	< 100kg/mo
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504	

	Questions	Answers
15a	**Wastewater:** Are there any wastewater discharges in this activity?	No
15b	**Air:** Are there any air discharges or emissions at this activity?	Yes
15b(1)	**Ozone Depleting Substance (ODS):** Are there any **ODSs** at this activity?	No
15b(2)	Will this activity include the installation and or use of **combustion equipment**? Combustion equipment includes boilers and internal combustion engines, such as generators.	No
15b(3)	Will this activity include the use of chemicals that could be Clean Air Act Regulated?	Yes
15b(4)	Will this activity involve open-burn activities?	No
15b(5)	Will this activity involve **soil disturbance, building demolition,** or **construction** that **disturbs soil,**, including access roads and staging areas?	No
15b(6)	**Radionuclide NESHAP:** Are there any **radionuclide air discharges** or use of radionuclides in gaseous form or at elevated temperatures at this activity?	No
15c	**Radioactive Waste:** Will this activity generate any radioactive waste, or will Members of the Workforce be required to handle radioactive waste?	No

	Questions	Answers
15d	**Hazardous Waste:** Will this activity generate any hazardous waste, or will Members of the Workforce be required to handle hazardous waste?	Yes
15d(1)	**Less-Than-90-Day Accumulation Area:** Will this activity store any hazardous waste in a **less-than-90-day accumulation area**?	No
15d(2)	**Acutely Hazardous Waste:** Will this activity generate any **acutely hazardous waste**?	No
15d(3)	**Waste Containing Mercury:** Will this activity generate any **waste containing mercury** (e.g., switches, thermometers, manometers, elemental mercury (Hg), or mercury compounds [e.g., mercuric oxide (HgO)], etc,)?	No
15e	**Mixed Waste:** Will this activity generate any **mixed waste**, or will Members of the Workforce be required to manage mixed waste?	No
15f	**Infectious / Biohazardous Waste:** Will this activity generate any infectious or biohazardous waste, or will Members of the Workforce be required to handle infectious or biohazardous waste?	No
15g	**Radioactive Contamination:** Will this activity be conducted in an area for which a reasonable potential exists for introducing **radioactive contamination** or causing activation of material that may become waste?	No
15h	**Material or Waste of Unknown Origin:** Will this activity require handling material or waste of unknown origin?	No
15i	**Fuels and Oil Storage:** Does this activity use a fuel or oil storage container capable of containing 55 gallons or more?	No
15j	**Discharges to Ground Surface:** Does this activity have a potential for any **discharges to the ground surface**?	No
15k	**Improvements/modifications to structure/building exteriors and landscaping:** Will this project involve activities that require modifications to the exteriors of structures and buildings or modification to existing landscape, including removal of vegetation?	No
15l	**Disturbance to habitat or protected species**: Will this project involve activities that will disturb habitat or protected species, including wildlife management and outdoor projects or testing activities?	No
16	**Packaging and Transportation of Hazardous Materials:** Will any activities covered by this PHS involve the packaging and transportation of hazardous material (including explosives or radioactive material)?	No
17	**Fire Protection Concerns:** Will the activity include any of the following? - Members of the Workforce modifying in any way any fire suppression or life safety system (fire rated walls, fire doors, fire sprinklers, fire alarm devices, fire extinguishers, or means of egress)? - Members of the Workforce performing hot work in association with this facility or project activity?	No
18	**Biological Materials:** *(see Help text before answering this question.)* Do activities involve the use of or potential exposure to biological materials?	No
19	**Confined Spaces:** Are confined spaces present in the work area?	No

	Questions	Answers
20	**Beryllium:** Do operations include any activities that? *(Review the Help text before answering this question)* - Use or handle beryllium, beryllium-containing alloys or beryllium oxides? - Create or work with **beryllium ceramics**? - Handle waste potentially-contaminated with beryllium or waste containing beryllium? - Perform **decontamination** of beryllium contamination? - Entail work in a beryllium contaminated building or area? - Apply abrasive or destructive methods to metal objects, articles, weapon components or bar stock, potentially containing beryllium? - Use non sparking tools containing beryllium?	No
21	**Other Hazards:** Are there any: - Hazards that have **not been adequately addressed** in other questions. (e.g., polar bears, foreign travel, specific chemical hazards, natural hazards [e.g., wind, excessive water, radon, or overhead trees]), **or** - Hazards of **unknown magnitude** (e.g., emergency response, hazards encountered by roving personnel) **Enter all of these hazards in the User- Specified Hazards table.** Enter "**Low**" as the **Hazard Classification** for hazards of unknown magnitude, unless the Safety Basis Department has determined otherwise.	No

Controls Worksheet:

	Questions	Answers
C1	**Local Exhaust Ventilation:** Do the activities covered by this PHS use local exhaust ventilation (LEV) (e.g., laboratory hoods, glove boxes, downdraft tables, "elephant trunks," canopy hoods, paint booths, slot ventilation, portable welding ventilation, etc.)?	Yes
C2	**Personal Protective Equipment:** Are hazards (e.g., chemicals radiological, electrical, mechanical, thermal, flying particles and/or falling or rolling objects) encountered that are capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact?	Yes
C2a	Has a workplace hazard assessment been performed for the activities covered by this PHS?	Yes
C2a(1)	Did the workplace hazard assessment determine that personal protective equipment will be required?	Yes
C2a(1)a	Has the workplace hazard assessment determined respiratory protection is required?	No
C2a(2)	Does the workplace hazard assessment allow voluntary use of respiratory protection?	No
C3	**Control of Hazardous Energy (LOTO):** Do you have **any equipment** in your operations that requires any of the following activities? - Construction - Installation - Setup - Adjustment - Inspection - Modification - Maintenance - Service - Lubrication - Cleaning - Unjamming - Making adjustments or tool changes	No
C4	**NEPA Compliance:** Has this project or activity been reviewed for National Environmental Policy Act (NEPA) compliance?	Yes
C4a	Are all relevant NEPA documents listed in the Documents section of this PHS?	Yes

IX. Hazard Analysis (HA) Section

Hazard Analysis

Note: 13 hazard analysis(es) were not reported, because no (optional) hazard analysis was performed for them.

X. Supplemental Information

PHS Input

Notes from Interview Questions

(Q 4) - The class 3B laser is enclosed and is intrinsically safe as operated. No operations, alignments or servicing involve openly accessible or exposure to the Class 3B beam.
(Q 5) - Standard solvents will be used in small quantities (tens of ml per day) for cleaning of samples.
(Q 5d) - Inert gases (nitrogen, argon, carbon dioxide, oxygen and helium) are utilized for processes within the clean room. The use of excess flow valves and the large number of air exchanges within the clean room significantly lesson the likelihood of an asphyxiant hazard.
(Q 5g) - A Line, Facilities, and ES&H team is identifying corrective actions to address site-wide issues with maximum allowable quantities for hazardous materials. Therefore, Operational Permits are not being issued at this time. Once corrective actions are identified, Operational Permits will be addressed by the Facility Fire Protection Assessment process (AP-230).

Notes from Controls Questions

User Entered Hazard Tables

Environmental Concerns Hazards

Source Name	Type	Est. Quantity
Wipes and Swabs	Hazardous waste	< 100kg/mo
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504	

Mechanical Hazards

Source Name	Potential Hazard	Com'l Available	Modified
Portable power tools		Yes	No
	Location: Site: SNLNM, Area: N/A, Building: AML, Room: Location Details:		

Pressure Hazards

Source Name	Description
Compressed argon gas	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:

Pressure Hazards	
Source Name	**Description**
House Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:
Liquid Nitrogen	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:
vacuum system	
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Comments:

RGDs

Source Name	RGD #	RGD Class	RGD Type	Accl. Voltage	Com'l Available	Modified	Custodian	SNL/NM Owned
Dual Beam FIB/SIM	216	Exempt Shielded	Inherently Safe	30	Yes	No	HEARNE, SEAN J.	Yes
	Location: Site: SSTP, Area: No Tech Area, Building: 518, Room: 1504 Location Details: Room = 1504; Area in Room = NE corner Comments: Alternate Custodian = AKHADOV, ELSHAN; RGD Status = Active							

PHS Output - Results and Conclusions

Major Safety Concerns

The hazard classification is: **SIH**

The required documentation is: **PHS**

The hazard classification is: SIH since this Facility or Lab involves:
(Required by general corporate business process) traffic related hazards for injury
(Required by general corporate business process) common electrical hazards
(QUESTION 1) potential for minor injury or illness
(QUESTION 5) Potential personnel exposure to chemicals & fire protection regulatory requirements
(QUESTION 5h) fire/explosion hazard
(QUESTION 6b) potential electrical arc from operating circuit breakers or disconnect switches
(QUESTION 7) potential injury from mechanical forces
(QUESTION 7b) potential injury from portable power tools
(QUESTION 10) Injury or damage
(QUESTION 15) potential for regulatory action
(QUESTION 15b) potential to emit regulated contaminants
(QUESTION 15b(3)) potential to emit regulated contaminants
(QUESTION 15d) potential for regulatory action

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Other Safety Concerns (potential hazard sources) for this Facility or Lab

no identified hazards
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Required Training

[Note: This training is a regulatory requirement for one or more people involved in operations associated with identified hazards. Each class may not be required by all people working in the area.] Please note that some training classes are only provided occasionally. Please be sure to allow adequate lead-time for personnel to schedule and complete training.]

NONE

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Results Based On Answers

The results in this PHS were based on the following answers to interview questions:
Q 0 answered: Y; Q 1 answered: Y; Q 1a answered: Y; Q 5 answered: Y; Q 5h answered: Y; Q 6b answered: Y; Q 7 answered: Y; Q 7a answered: N; Q 7b answered: Y; Q 10 answered: Y; Q 10a answered: Y; Q 10d answered: Y; Q 10e answered: Y; Q 10f answered: Y; Q 15 answered: Y; Q 15b answered: Y; Q 15b(3) answered: Y; Q 15d answered: Y;

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Interquestion Dependency Concerns for this Facility or Lab document:

(none)

XI. EOC Concerns

Chemical; Energized Electrical; Energized Mechanical; Energized Systems - RGD; Environmental Concerns; Pressure